Those who can – play; Those who can't – use music tech?

Introduction

The last fifteen years have seen a transformation in classroom approaches to music education with technology. During the early to mid 1990s, computers or other digital technologies were seldom seen in music classrooms. Whilst some teachers had been exploring tape-based technologies and other electronic devices (Orton 1981), the majority of teachers had access only to minimal levels of technology beyond basic tape recorders and the occasional Atari computer. Whilst ICT received a mention in the first version of the English National Curriculum for Music, particularly as a way of encouraging musical composition within the classroom, it was not a major part of the majority of music teachers' classroom practice.

As the 1990s progressed into the first decade of this century, we witnessed a much greater access to new technologies, both within schools and wider society. Hardly a week now goes by without comment in the international press about a new technological innovation or application related to the production, reception or consumption of music in one form or another. Regularly there appear new virtual pianos, drums and guitars and other instruments to play with on hand-held devices such as the beautiful iPad instrument Seline HD (Amidio 2010).

Within the school, things have also changed radically. Music departments today have a much broader range of ICT available. It is not uncommon to see dedicated computer suites for musical activities, interactive whiteboards, a range of smaller pieces of music technology equipment and, at least in principle if not practice, an acknowledgement by many teachers that hand-held devices such as mobile-phones or iPods and iPads have potential as musical instruments.

However, as we will discuss below, unlike the technological developments in wider society, the developments within the world of formal classroom music education have not yet exploited the potential of these new technologies to the full. The disjunction between these two worlds has been noted by many authors (Savage 2004, p.167; Cain 2004, p.217; Ofsted 2009, p.34).

Why is this? Many reasons can be put forward. Perhaps there has been a tendency to isolate music education with ICT and consider it as conceptually and philosophically 'different' from music education without ICT? Perhaps this 'difference' has isolated some teachers as ICT 'experts', or even 'music technologists', and disempowered others whose skills, they consider, might lie elsewhere. Perhaps these differences have been overstated by some to reinforce the need for a framework of qualifications, resources and specialist staff that have a particular interest in ICT? But, at a fundamental level at least, is learning to play a virtual instrument really that different from learning to play a traditional instrument? Is using a sampler to create and explore sounds really that different from working with another live instrumentalist? Composing with a pen and paper is different from using

a piece of compositional software on a computer (see Adams (2010) for a beautiful and very humours exploration of this. But these differences can easily be misunderstood and overstated, thereby masking the commonalities in approach and use within particular musical contexts.

Within the music education research community there has been considerable discussion of these issues. Espeland used the opportunity of his keynote address at the Research in Music Education conference in 2009 to explore the tensions between those who support the use of technology as opposed to those who do not (Espeland 2010, pp.129-130). Many of the arguments he presents for either side are familiar. Perhaps of greater interest, are his comments relating to what he perceives as the effect of using technology in music education. He cites Salomon and Perkins (2005) who describe three different kinds of effects related to learning: effect with, effect of, and effect through technology. He continues:

> Effects with technology, they say, take place when technology makes it possible for the individual to reach a higher level of learning than without technology. Effects of technology mean that technology gives the student experience and practise, which also is useful when technology is not present. Effects through technology mean that the activity in question changes or is being restructured. … Will technology change the essential activities and contents of music education, and if so, will this change mean that music education will move away from its preferred artistic, performing and bodily-based core? (Espeland 2010, p.130)

In his concluding comments, following a broader historical analysis of the role of the gramophone and its affect on music listening, he raises a series of interesting and very pertinent questions:

> What kind of digital skills in music education might enhance analogue skills and vice versa? How do analogue and digital skills interact meaningfully in music education processes of different kinds? In what way and in what kind of considerations and decisions, considering musical ideas, end-results, performance, reception and music education process profiles, will technology contribute uniquely? And finally; when should technology not be used? (Espeland 2010, p.132)

This chapter will seek to provide an investigation into some of these questions. Drawing on several recent pieces of research, it will commence with a brief overview of the current state of ICT in music classrooms across the United Kingdom. Following this, a model of digital literacy will be introduced and applied to the work of music education. It will argue for a broader model of development for music education with ICT that relates, symbiotically, to established models of musical development with which many educators are already familiar.

Recent Research into ICT usage in the Music Classroom

In the introduction we explored, briefly, how music education with ICT within the classroom setting has developed over the last fifteen years. We identified broad differences between the speed of technological developments within and outside the school, and questioned why musical uses of ICT have, on occasions, been slower to respond to the various opportunities for alternative models of music education with

ICT.

Recent research conducted (Savage 2007, 2010) has explored these issues in significant detail. This research, along with comments drawn from a recent Ofsted report (Ofsted 2009), reveals the following key points.

1. There is an inherent conservatism in musical pedagogies with technology.

Firstly, despite these wider and significant cultural changes in the use of digital technologies, music education within the classroom is predominantly still technologically conservative. Observations of classroom practice in numerous schools revealed many basic uses of ICT for MIDI sequencing and score-writing dominating teachers' work at Key Stage 4. Whilst there is nothing wrong with these applications per se, they are characteristic of a previous era of music technology use that, in many cases, has developed rapidly in recent years but has yet to make a significant impact in the classroom. There was a noticeable lack of integration of hardware and software with other classroom resources. In many cases, the use of ICT within the music classroom made little, if any, links to potential musical applications of ICT outside the classroom.

2. Priortising the use of ICT in music education for older students reinforces this inherent conservatism.

Secondly, recent research has shown that teachers believe they are more successful in their teaching with ICT as their students get older. They reported a greater degree of impact in their use of music technologies in Key Stage 4 and on post-16 courses than with younger students at Key Stage 3 (Savage 2010, p.96-97). This seemed to be because they felt they could judge 'success' with music technology when it reinforced a traditional approach to music education, such as the production of a musical score. There were a number of explanations for this. Some teachers felt that the 'overbearing' and 'rigid' structures of GCSE specifications actively discriminated against the creative use of new technologies. It was interesting that musical performance with any type of ICT was peculiarly absent from the reported observations in both pieces of research. This reinforces the general perception reported by OfSTED, that school either implicitly or explicitly tend to encourage only students with traditional instrumental abilities to take further their musical studies through the GCSE qualification:

> An over-emphasis on instrumental skills also contributed to lack of continuity in Key Stage 4. Music GCSE is not always seen as a natural extension to work in Key Stage 3 and the schools surveyed discouraged students, explicitly or implicitly, from taking GCSE if they did not have additional instrumental lessons or were not already an accomplished performer. (Ofsted 2009. p.52)

3. Student experience with ICT at Key Stage 3 is limited.

The prioritisation of ICT in music education within Key Stage 4 and post-16 courses

is matched by a limited use of ICT at Key Stage 3. The Ofsted report makes this clear in two places:

> There was insufficient use of ICT in music, even though it is a statutory requirement in Key Stage 3. A detailed focus on 22 schools in the survey showed the use of ICT to be inadequate in more than half of these; only four were good or outstanding in this respect. (Ofsted 2009, p.34)

The use of ICT by the music profession continues to expand the range of music available to all students. For example, music technology encourages more boys to take Music A level, but it is underused at present, particularly in Key Stage 3 (Ofsted 2009, p.6). There are many reasons for this, but perhaps the most obvious one relates to the larger class sizes at Key Stage 3 and the accompanying lack of enough pieces of technology for a whole class to use. It requires quite a skilful and creative pedagogy to conceive of whole class approaches to the use of music technology for a particular topic given scarce resources. It is much easier when you have smaller classes at Key Stage 4 (and even smaller classes than that at Key Stage 5). Other reasons for the comparative lack of usage at Key Stage 3 will be explored below.

These findings are interesting to compare against another piece of recent research conducted on behalf of the Associated Boards of the Royal Schools of Music (Fautley & Savage 2008). This examined trends in composition and assessment at Key Stages 3 and 4. Two findings are particularly relevant:

1. Performance is the major curriculum component at Key Stage 3 and this changes to composition at Key Stage 4;
2. Group work approaches to performance and composition dominate the curriculum at Key Stage 3, with more individual engagement with composition at Key Stage 4.

In comparing the findings related to ICT (Ofsted 2009; Savage 2007, 2010) and the broader reflection on types of curricular activities (from Fautley & Savage 2008), it seems certain that the increase in ICT usage in Year 10 onwards, reaching a plateau of around 55% of curriculum time in Year 11 (Savage 2010, p.96), can be ascribed to the increasing use of individual activity with composition software such as Sibelius or Cubase. The domination of these pieces of software reinforces the individual, conservative model of music education as discussed in the first point above; the larger number of students and the emphasis on group work at Key Stage 3 have meant the ICT usage at this phase is under-developed.

4. The missing link

Finally in this brief overview of the current state of play in relation to how ICT is used in music classrooms, the introductory points about a divide between students' experiences inside and outside school was a feature of the Ofsted study:

> Music technology is changing rapidly and the schools found it difficult to develop their own resources in line with the quality of equipment which students were

> seeing – and sometimes using themselves – outside school. Consequently, ICT in school could appear dated to them. (Ofsted 2009, pp.34-35)

Many teachers, quite reasonably perhaps, embrace ICT into their teaching as just an extension of what they normally do.'. The adoption and adaptation of pieces of technology becomes just another tool in a long list of potential resources, so when new technologies become available, these models of working are simply transferred to existing frameworks of musical development prescribed within the National Curriculum or GCSE specifications.

This can lead to uncritical responses where, for example, students are placed in front of computers to complete activities that are un-musical, often divorced from a meaningful context, with little sense of purpose and, on occasions, simply a cover for the lack of effective teaching in basic musical skills. Typically these inclue:

- Unskilful uses of music notation technologies produce scores where considerations of instrumentation have been given cursory attention and instruments play at either impossible ranges or with little thought to specific instrumental techniques (bowing, phrasing, the requirement to breath, etc.);
- Insensitive and over-enthusiastic approaches to cutting and pasting in music sequencing software lead to compositions that have weak structures, lack of contrast and little, if any, melodic, harmonic or rhythmic variation and development;
- Creative 'borrowings' or 'samplings' of others' work through the opening of access to digital media is done with little thought to style, context, reinterpretation or ownership;
- An over-reliance on auto-accompaniments, auto-tuning or other supportive technologies for musical performance provide cover (or an excuse) for the lack of rigorous teaching and training in basic musical skills (such as those required to play together in a group, or sing in tune);

These appropriations of technology into the music education are not neutral. They do more harm than good and prevent exchanges of real value from occurring.

However, this needs to change. As different technologies are allowed to permeate more deeply, pedagogical approaches need to develop more radically. In other words, differences begin to appear when the extent or the use of technology becomes more extreme. This chapter will argue that well established models related to digital literacy need to be more understood and appropriated within music education. These models will, at least in the short term, co-exist alongside traditional models of music development. In the longer term, it is hoped that further research will be done to explore a fuller degree of integration. It is time to turn our attention to one of these models.

Martin's Model of Digital Literacy

There is an expansive literature associated with the concepts of digital literacy and many models have been described (Bélisle 2006; Gilster 1997; Søby 2003). The following part of this chapter will explore what digital literacy means through a

consideration of one such model. Following this, we will consider what the implications of these ideas might mean for music education with technology.

Martin defines digital literacy as:

> … the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process. (Martin 2006 , p.19)

His more recent research (2009) continues to apply this thinking in the development of three 'levels' of digital literacy:

- Digital competence (which Martin believes is a precursor of digital literacy);
- Digital usage;
- Digital transformation.

1. Digital Competence

This includes:

- Skill acquisition with a full range of digital tools;
- Finding information;
- Preparing and publishing digital resources using software tools;
- Various forms of electronic communication and interaction.

Martin acknowledges that many of these elements will build on broader knowledge, skills and understanding obtained in traditional, non-digital contexts.

2. Digital Usage

For Martin, digital usage embeds skills and concept drawn from digital competence and contextualises them in real life situations. So, he argues that:

- Users draw upon relevant (domain-specific) digital competencies and apply them to specific contexts;
- These competencies are shaped and adapted by the requirements of the situation and the 'digital usages' are, in Martin's phrase, 'uniquely shaped' by the particular expertise of the individual, their life history and wider experiences.

3. Digital Transformation

This is the ultimate stage of digital literacy where the *digital usages* are developed to facilitate innovation and creativity, stimulating significant change within the personal or professional domain. Martin's research suggests that whilst reflective action is needed at all stages of digital literacy, it becomes essential here. Critical reflection and reflective action is a key requirement for this transformative stage.

Figure 1 demonstrates what Martin's model of digital literacy might look like in the context of a student's use of a music sequencer:

< insert Fig 1>

Developing Models for Music Education with ICT

So far, this chapter has surveyed the current usage of ICT for music education in classrooms across the United Kingdom. It has introduced one model of digital literacy drawn from the research literature. This model will be considered alongside established models of musicianship and musical development that have been well researched elsewhere.

As an example, Fig. 2 shows how Kratus' (Kratus 1995) development model for improvisation could be aligned with Martin's three-staged model for digital literacy.

Insert Fig. 2 about here

Exploring sounds and developing simple improvisational processes and products, could all be conceived as requiring a set of ICT skills that are situated broadly within the category of 'digital competence'. The step towards a fluid, structural and stylistic improvisatory approach (levels 4 – 6 in the Kratus model) would require a more advanced use of ICT, perhaps applying competences to a particular context (a characteristic of digital usage rather than digital competence). Finally, the ability to use musical improvisation to develop a personal style that transcends the stylistic (something that few attain according to Kratus) has similarities to the power of ICT that is shaped, adapted and used by the individual user to transform their approach to an activity and redefine, fundamentally, key aspects of the task and even their identity.

However, the alignment of these models could be completely unnecessary if one takes the view that the generic processes of learning to improvise are completely independent of any set of tools through which one might access them. In other words, is learning to improvise on a trumpet any different from learning to improvise with your voice, or is that any different from learning to improvise with a virtual instrument like the Seline HD (Amidio 2010)? If your answer is no, then the developmental model for musical improvisation presented by Kratus is complete within itself. There is no additional benefit in bringing other developmental models alongside it.

But the tools we choose to use for particular activities, like musical improvisation or

performance, do shape those activities in a practical, conceptual and philosophical ways. Wertsch's exploration of this point (Wertsch 1998, pp.27-28) is particularly helpful. He takes an example from the world of pole-vaulting and charts the various rivalries and factions within the sport that emerged at transition points surrounding the adoption of new poles. At one point these even included the possibility of breakaway groups favouring a particular type of pole, and accusations that users of new types of poles were cheating. The history of pole vaulting itself distinguishes between the various ‘eras’ of particular poles (On Track and Field 2009).

It might sound obvious, but the pole is essential to pole-vaulting. It mediates the action between the athlete (the agent) and the goal of hurtling over the barrier at the highest possible height (the context). There is a link between human actions with a pole and the cultural, institutional and historical contexts in which this action occurs. In our context, teachers or students are the ‘agents’ (to use Wertsch’s terminology), the ‘cultural tools’ are the technologies we are choosing to use, and the context would be, at least in a simple application of his work, your classroom or other learning spaces where students can work informally. Wertsch calls the interplay between agents, tools and contexts ‘mediated action’.

Applying this to our discussion, the technologies that we or our students choose to use will allow us to engage with activities in different ways and achieve different outcomes. Learning to improvise in music with the use of a specific piece of music technology is a different but related process to learning to improvise by a more traditional method. To that end, it is a useful exercise to consider different developmental models alongside one another. Whilst they might not match up perfectly, the tensions they facilitate will create an opportunity for thinking differently about how music teaching and learning really works with technology.

ICT and ‘Cultures of Tension’

John takes up this theme in his writing by identifying the tensions that occur when digital technologies are brought alongside an established subject culture like that within music education:

> At the core of this is ‘cultures in tension’, the idea that the particular discourses that have dominated the educational landscape for more than a century and a half have been thrown into sharp relief by the rise of digital technologies. (John 2005, p.471).

How we respond to this 'cultural tension' is important. It could result in music education retracting and consolidating, with ICT skills becoming situated as part of a wider generic and functional agenda for education rather than being adopted explicitly. This might suit traditionalists who believe that digital technologies threaten or dilute the core values and principles of music education (the 'conservative' approach noted above). Or, it could result in tokenistic pedagogical responses to the adoption of ICT within music education that reinforce traditional approaches (e.g. the uncritical use of music notation software to present a GCSE composition).

John explores this tension through the use of a metaphor (that of a 'trading zone') through which a subject culture (like music) can begin to build bridges with other

'tribes' (like ICT):

> The crucial ‘borderlands’ between the subject and ICT became transaction spaces or ‘trading zones’ where exchanges and intense collaborations take place. Each tribe can bring things to the ‘trading space’ and take things away; even sacred objects can be offered up and exchanged. This trading process also gives rise to new contact languages which are locally understood and co-ordinated. (John 2005, pp.485-6)

However these ‘trading zones’ offer a space within which cultural tensions can be a positive thing. John's metaphor of a ‘trading zone’ highlights the transient, evolving and incomplete nature of the relationship between music education and digital technologies. To occupy a ‘trading zone’ does not mean that we need to abandon our ‘sacred home’ nor allow the ‘profane’ to dominate or limit the exchange. Rather, it encourages a process of subtle negotiation that will help develop alternative models and dimensions with music's subject culture over time.

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This ongoing process of exchange or interaction between the traditional approaches to music education and broader processes of technological development is something that we can all facilitate. It may lead to an opportunity of a new language or discourse of music education with digital technology emerging. But this will only happen when the items that are being exchanged are of value. As our analysis of the research at the opening of this chapter has shown, there are plenty of low value exchanges being done between music education and technology in our schools already.

Whilst these implications are important for how we consider the use of an individual piece of technology, they will also have implications for the pieces of technology that we choose to put in our classrooms, and how these are contextualised within our units of work. To what extent are we allowing students the opportunities to develop their competencies in choosing which pieces of technology to use in a task (and this would include the 'technologies' of traditional instruments as well as digital technologies) and then asking them to consider and reflect on the consequences of these choices? A lack of critical evaluation about the effects of these choices can have disastrous consequences for our musical products!

So, the extent to which ICT presents a barrier to learning in music, or whether it is inclusive or exclusive is, perhaps, the wrong way to think of this. ICT, as a category or series of objects, will not create a barrier any more than, say, a clarinet would create a barrier to learning. As someone with no clarinet skills, giving me a clarinet to perform with would require me to undertake a learning process of some sort before feeling confident to perform a simple piece. How is this different from me giving you a copy of Seline HD and saying perform a piece with this?

The skills that we need to use ICT effectively are well known. They include:

- Cognitive skills;
- Practical skills;

- Communication;
- Control;
- Reading with meaning;
- Writing with meaning;
- Functioning effectively in a community;
- Apply skills within a social context;
- Demonstrating skills;
- Enriching and transforming thinking;
- Empowering the intellect;
- Understanding the relationship between the individual, others and the wider world;
- Developing goals and visions;
- Conveying thoughts, understanding, interpretation, belief, attitudes and emotions.

But these are also musical skills. The links by now, I hope, are obvious. As teachers, the challenge is finding meaningful and creative contexts within which these skills can be developed systematically.

There are several ways in which teachers can design and implement more structured units of work that integrate digital technologies in musical and creative wayIn order to do this, it will be necessary for teachers to acknowledge a number of key points..

Firstly, that digital music technologies are different. They require students to learn a new set of skills in terms of their use and application to particular musical tasks within a unit of work. Time needs to be allowed for this process of development to take place in the unit of work. Students should be given time to experiment and explore a new piece of digital technology as well as master its basic operation. On occasions, teachers will need to dictate outcomes for a particular task; but on others, they can be flexible and allow students to follow their own interests and imaginations within a broader musical context.

Secondly, recognise that digital music technologies are broadly similar to other tools one might want to use. Although this seems contradictory to the paragraph above, it really is not! Any given piece of technology has much in common with other pieces of technology that preceded it (we just call those older pieces of technology 'instruments'). So, given their relative historical contexts, is there that much difference between a piano's sustain pedal and a Boss effects pedal? Both effect the sound, both require the use of the foot, both were innovative in their day and had consequences for how composers wrote and performers played.

The consequences of this point for the development of meaningful and creative contexts within which musical skills can develop is that teachers might/should:

- Make links within and between units of work that show students, unambiguously, how music-making with digital technology is not so different to music-making without.
- Trace the historical, cultural and sociological backgrounds to digital technology in their teaching (they did not just appear and this can be done in

a fun way too!).
- Try and break down the unhelpful artificial walls that have been built in recent years between music technologists and other musicians. We are all musicians.

Thirdly, meaningful and creative musical contexts for the development of musical skills with technology will be built upon the traditional underpinnings of effective music education, namely an integrated approach to performing, composing and listening. Units of work that place students in front of a computer, isolated, musically and socially, from others, do more harm than good. This is not to say that the individual use of music sequencing software or music notation software does not have a place in a contemporary music education. It will. But if some of the poor practice and ill-conceived approaches that research has identified are to be undone, units of work that rely on such approaches need to be re-contextualised and re-imagined. Teachers need to rediscover the notion of teaching music musically (of teaching music technology musically perhaps?). As this chapter has argued, the two are not so different.

Developing musical contexts for the effective use of ICT present significant challenges. But the rewards are also significant when we contextualise digital literacy and the associated range of skills and competencies within the field of music education. We need to take and integrate these alongside those specific musical skills that we know all students require as part of their music education. As teachers, we need to think and act creatively. Perhaps here, more than anywhere, there are benefits in teachers communicating and collaborating with each other. Many of the most creative uses of music technology in teaching take place at the margins of music education. If I can add a personal note here, in my experience this has often been in schools for students with emotional, behavioural and other difficulties; or in community music or other workshop settings; or in schools for students with profound mental or physical difficulties.

For all sorts of reasons, breaking out of the 'silo approach' to music teaching is vital. But perhaps here, in a realm of the music curriculum where many teachers feel uncomfortable and under-skilled, there is a requirement to see and hear what skilful, knowledgeable and creative teachers can do with digital technologies first hand. If finding time to do this is difficult, social media provides a window on the work of many of these practitioners but also perhaps making time to seek out some of these practitioners and prioritise learning about alternative approaches to the use of digital music technology.

Conclusion

New models of musicianship and musical development will develop as we seek to engage young people in a process of music education that facilitates and builds on their emerging fluency with digital tools. These will be far removed from the conservative models of music education with technology that we explored at the opening of this chapter.

Engaging with music through technology is, as we have explored, closely related to the broader types of musical engagement that we seek for our students. After all, as we have explored throughout the chapter, digital technologies are not that different from other forms of technology. In this sense, ICT creates no more of a barrier to music learning than anything else might do. ICT, like any technology (including musical instruments), need to be understood in a particular context. The positive or negative impact it has depends on a whole host of factors, some intrinsic to the tool itself and others spread much more widely throughout that context.

Espeland's questions quoted at the opening of this chapter are right to highlight areas of difference between music education with and without technology. But to focus on these too heavily is to miss the vital connections that all technologies (whether digital or non-digital) have to broader processes of music development and understanding. For sure, there are specific things that digital technology can do that are impossible to do in other ways and these may lead, over time, to the creation of new models of music development. But we are not at that point yet. Rather, as Espeland explores, the relationships between musical activities with digital and non-digital tools is where our attention should be focused.

Perhaps one of the most worrying trends in recent years has been the development of courses and qualifications for 'music technology' that separates a particular type of music student from those identified as traditional 'musicians'. This artificial and divisive approach to music education results in second class musicians (a kind of 'those who can do, and those who can't use music technology'). As long as this system remains, teachers will always have the opportunity to opt out and say that music technology is not for them or their students.

As we have seen, the links between music education, musical development and digital literacy are well-founded. The challenge is to provides a unified and integrated model of music education both within and across the Key Stages, making sure that all students can use a range of technologies (both digital and non-digital) as they develop their musical skills, knowledge and understanding,

Reflective Questions

Compare and contrast what your approach might be to a particular sequence of learning with a piece of ICT and to a similar piece of learning without. What differences do you notice? In particular, focus on the ways that you and your students would use ICT in the first approach. What are these replaced by in the second approach? Have you been able to identify any differences in your pedagogy within these two approaches? Which do you feel is more effective? Why?

Examine some of the development models for other musical processes such as composing or listening. How do these relate to the models for digital literacy discussed in this chapter? What similarities or differences can you notice? How might they relate together? Are there tensions that can be explored creatively?

What are the potential new approaches that might be facilitated when music education adopts and embraces digital technologies in a more substantial way?

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